

Abstract of the Disclosure

Disclosed is a method for a gate electrode of a semiconductor device, which forms a re-oxidation film of a sufficient thickness by a low temperature re-oxidation process. Gate oxide film, doped-silicon film, tungsten nitride film, tungsten film, and hard mask film are sequentially formed on semiconductor substrate. Hard mask film is patterned. Tungsten film and tungsten nitride film are etched using patterned hard mask film as an etching barrier in order to expose doped-silicon film. Predetermined oxidation-accelerating ions are implanted into a portion and a side of exposed doped-silicon film. A portion of exposed doped-silicon film is etched. Substrate resulting object is re-oxidized to form a re-oxidation film at a side of etched doped-silicon film.